



# Internal Audit Report

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## Materials Testing

TxDOT Office of Internal Audit

## Objective

To determine if the process for testing materials in highway construction and maintenance projects is adequate.

## Opinion

Based on the audit scope areas reviewed, control mechanisms are effective and substantially address risk factors and exposures considered significant relative to impacting operational execution and compliance. The organization's system of internal controls provides reasonable assurance that key goals and objectives will be achieved despite control gap corrections and improvement opportunities identified. Control gap corrections and improvement opportunities identified have the potential to negatively impact the achievement of the organization's business/controls objectives.

Overall Engagement Assessment	Satisfactory
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Findings				
	Title	Control Design	Operating Effectiveness	Rating
Finding 1	Data Integrity in SiteManager*	x	x	Needs Improvement
Finding 2	Quality Assurance Documentation	x	x	Satisfactory

Management concurs with the above findings and prepared management action plans to address deficiencies.

## Control Environment

The Construction Division (CST) grants access to and maintains SiteManager, which is the source of record for testing results. CST establishes material specifications and enters these specifications into SiteManager for test result comparison.

Tester certifications, which are obtained through training and successful performance on a certifying exam, are a primary means of ensuring the tests are performed by qualifying individuals. Specific requirements of each certification or certification renewal include, for example, completion of a written test and a field test pertaining to the specific material. There are more than 4,000 active testers with access to SiteManager who enter material test results. Of the active testers, there are 175 testers who are external users.

TxDOT has approximately 180 locations to test materials; however, districts have the option to contract with external parties to assist with testing requirements.

\*SiteManager is a registered trademark of American Association of State Highway and Transportation Officials (AASHTO)

**Summary Results**

Finding	Scope Area	Evidence
1	Materials Testing and Support  Materials Certifications	<p>Evaluation of the districts' review process for materials testing identified the following:</p> <ul style="list-style-type: none"> <li>• 26 of 91 (29%) material tests noted sample dates indicating they were collected after the tests were performed.</li> <li>• 4 of 91 (4%) material tests noted to have inadequate segregation of duties among the performer, reviewer, and final approver of the test.</li> </ul> <p>2 of 91 (2%) material tests used specifications that resulted in an incorrect conversion factor used to calculate the minimum number of tests.</p> <p>Evaluation of the certification tracking process, to ensure testers have the required testing certifications, indicated the following:</p> <ul style="list-style-type: none"> <li>• 17 of 123 (14%) certifications, which material testers are required to obtain, had inaccurate expiration dates within SiteManager and Labinator. Further review noted no employee testing certifications had expired.</li> <li>• One district did not use SiteManager or Labinator as the primary certification tracking tool.</li> </ul>
2	Materials Certifications	Review of tester certifications identified 33 of 123 (27%) did not have required supporting documentation; however, all testers were proven to be certified.

**Audit Scope**

The audit scope focused on supporting documentation of material tests performed in the district labs and included in SiteManager and Labinator, compliance by those labs with TxDOT policy and procedures when performing testing, and having properly segregated duties, certification status of the testers, and retention of documentation to support those certifications. These activities were reviewed through a stratified sample of 91 tests from state-wide active projects and three certifications per test (totaling 123) to assess the adequacy and sustainability of the material testing process within TxDOT and external contractor labs.

The audit was performed by Alma Alvarez, Kathy Baca, Albert Bourque, Dennis Frazier, Letta Hinton, Keith Laird, Jennifer Stanush, and Lindsay Bibeau (Engagement Lead). The audit was conducted during the period from March 9, 2015 to May 15, 2015.

**Methodology**

The methodology used to complete the objectives of this audit included judgmentally selecting construction and maintenance projects which used flex base and concrete and reviewing the testing performed on those materials. Two projects, including related tester certifications, were then randomly selected from each district. For each selected project, at least one test of concrete or flex base was selected for further process evaluation.

The following procedures were completed to perform the audit fieldwork and the objective of this audit:

- Reviewed TxDOT internal documents, including SiteManager Materials Management, the Quality Assurance Program, and Construction Administrative memos
- Reviewed sections of state and federal code, such as the Texas Administrative Code and the Code of Federal Regulations, relating to materials testing
- Conducted interviews with key personnel within the Districts, and the Construction Division
- Obtained a list of material testers and interviewed district personnel who are involved in the material testing process, such as the district and area office laboratory staff
- Selected a stratified sample of 91 active projects state-wide that include concrete and flex base materials
- Tested the selected sample for the following:
  - Compared the required minimum number of tests to the actual number of tests performed using the SiteManager Contract Sampling and Testing Deficiencies Report
  - Compared the required versus actual test quantities for compliance with guidelines
  - Compared the timing of the material test versus the date the sample was collected in SiteManager for reasonableness
  - Reviewed and verified certificates for individuals performing materials tests and compared certificates to information stored in SiteManager and Labinator feature

## Background

This report is prepared for the Texas Transportation Commission and for the Administration and Management of TxDOT. The report presents the results of the Materials Testing audit which was conducted as part of the Fiscal Year 2015 Audit Plan.

The Construction Division (CST) and the districts rely on the materials testing process to ensure materials meet standards and maintain project quality. In order to ensure TxDOT is obtaining quality materials on each project, TxDOT has developed minimum standards that materials should meet prior to acceptance. Material testing protocol incorporated in TxDOT projects includes various quality assurance procedures such as material tester certification and quality monitoring to ensure minimum standards are met.

TxDOT's primary testing activities are conducted in the districts. Each district is responsible for testing materials for their projects either by contracting out the testing or performing the testing within the district or area office labs. In addition, the districts are responsible for maintaining certification records for both vendors and TxDOT testers. CST, the office of primary responsibility, is responsible for maintaining the manuals, SiteManager, and Labinator. SiteManager maintains all testing information for each project and Labinator is a database that retains certification information for each tester within SiteManager. While they are separate systems, Labinator feeds its information into SiteManager.

A statewide listing of all material tester certifications is maintained within SiteManager and Labinator, which allows material testers with current certifications to enter test results into SiteManager.

We conducted this performance audit in accordance with Generally Accepted Government Auditing Standards and in conformance with the International Standards for the Professional Practice of Internal Auditing. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. Recommendations to mitigate risks identified were provided to management during the engagement to assist in the formulation of the management action plans included in this report. The Office of Internal Audit uses the Committee of Sponsoring Organizations of the Treadway Commission (COSO) Internal Control – Integrated Framework version 2013.

A defined set of control objectives was utilized to focus on operational and compliance goals for the identified scope areas. Our audit opinion is an assessment of the health of the overall control environment based on (1) the effectiveness of the enterprise risk management activities throughout the audit period and (2) the degree to which the defined control objectives were being met. Our audit opinion is not a guarantee against operational sub-optimization or non-compliance, particularly in areas not included in the scope of this audit.

### **Best Practices**

The Paris District lab has created a comprehensive process checklist to help facilitate a review at the end of each project. The district lab performs these reviews regardless of where in the district the materials were tested. The additional review helps to maintain the integrity and completeness of SiteManager data for each project.

## Detailed Findings and Management Action Plans (MAP)

### Finding No. 1: Data Integrity in SiteManager

#### Condition

The review and monitoring process to support district materials testing is not operating optimally to ensure the integrity and completeness of test data. Data errors were identified within SiteManager, including sampling and certification dates, single user sign-offs, and the required number of tests to be performed per material.

#### Effect/Potential Impact

Inaccurate/unreliable SiteManager data used by project decision makers could result in project materials that do not meet specifications, potentially require rework, and cause safety concerns and additional costs to TxDOT.

In addition, certification dates that are invalid within Labinator will inactivate the tester's access within SiteManager and could impact their ability to document test results.

#### Criteria

TxDOT's SiteManager Materials Management Manual defines the sample date as the criteria used to locate a sample based upon a time period. It also defines the certificate expiration date field to display the expiration date for the test procedure of the individual qualification type and level. The dates are required to support the materials testing process.

TxDOT's policies and procedures require that two individuals, one individual performing documentation and a separate individual performing review or authorization, must be documented within SiteManager in order for a tested material sample to be completed.

#### Cause

SiteManager auto populates the sample date at the creation of the testing documentation and users are required to manually change the date to the date the material sample was collected so that it doesn't appear the sample collection date comes after the material testing date.

"Cloning" of materials tests within SiteManager is a process used to copy an old test to create a new test. When these new tests are setup, data and materials specifications can be copied from the old test. If the specifications in the old test are not current, use of these outdated specifications can result in faulty calculations of the conversion factor, which determines the required number of tests for a particular material.

In September 2013, an edit check was added to SiteManager to prevent a conflict of duties where a single user would be able to perform, review, and authorize the material test. However, this edit check was not added to the excel files within SiteManager or on the remote access to SiteManager through Citrix, resulting in the continued allowance of a single user to have access to sign-off on all three tasks.

All certifications are entered manually from completed exams or printed completion certificates by each of the districts. These manual inputs have resulted in certification dates appearing as if they have expired.

**Evidence**

Evaluation of the districts' review process for materials testing identified the following:

- 26 of 91 (29%) material tests reviewed reported material samples collected after the tests were performed
- 2 of 91 (2%) material tests used inaccurate specifications, resulting in an incorrect conversion factor to determine the minimum number of tests needed

A review of various assignments and sign-offs to verify adequate segregation of duties existed identified that 4 of 91 (4%) material tests had the same individual performing, reviewing, and authorizing the material test.

Evaluation of the certification tracking process to ensure material testers have the required testing certifications indicated the following:

- 17 of 123 (14%) certifications, which material testers are required to obtain, indicated expiration dates that did not match the expiration dates entered into SiteManager or Labinator tracking system. Although it appeared the material tester's certification had expired in either system, it had not.
- One district visited did not use SiteManager or Labinator as the primary certification tracking tool

**Management Action Plan (MAP):****MAP Owner:**

Darren G. Hazlett, P.E., Construction Division Deputy Director

**MAP 1.1:**

Construction Division will issue a memo to emphasize the importance of complete and accurate data within SiteManager and will remind users of the policy published in the SiteManager Materials Management Manual regarding the Sampled Date and (tester certification) Expiration Date fields.

**Completion Date:**

December 15, 2015

**MAP Owner:**

Stewart DeWitt, Business Analyst, Construction Division

**MAP 1.2**

Construction Division will modify SiteManager to disallow material sample test dates that precede the material's sample date, recognize the discrepancy, and prompt the user to remedy.

**Completion Date:**

December 15, 2015

**MAP Owner:**

Stewart DeWitt, Business Analyst, Construction Division

**MAP 1.3**

Construction Division will request that a database trigger be added to the SiteManager application database to capture inserts, deletes, and updates recorded in the database tables that list the tester certifications.

**Completion Date:**

December 15, 2015

**MAP Owner:**

Stewart DeWitt, Business Analyst, Construction Division

**MAP 1.4**

Construction Division will work with the districts to investigate the possibility of a system anomaly that might be changing expiration dates. In addition, to better help the Districts take inventory of when updates occur, the Labinator tool will be updated to display when and by whom a record was last updated.

**Completion Date:**

Action Completed

**MAP Owners:**

Lance Simmons, PE – District Engineer – Bryan District

Chris Cowen, PE – Director of Construction – Bryan District

**MAP 1.5**

The Bryan District Lab will cross check the testing certification dates in SiteManager with the dates on the hard copy certifications and correct, as necessary. Additionally, they will work with the Construction Division to monitor the data to ensure the dates remain as entered.

**Completion Date:**

Action Completed

**MAP Owner:**

Stewart DeWitt, Business Analyst, Construction Division

**MAP 1.6**

The SiteManager Citrix MetaFrame servers will be updated with the MS Office 2010 suite, which allowed Construction Division to distribute application fixes to those servers to close the previously identified segregation of duties gap within the system. This update will allow all versions of SiteManager (non-inspector, MTS, and Citrix) to meet the material sample authorization segregation requirement outlined by policy.

**Completion Date:**

Action Completed



**Finding No. 2: Quality Assurance Documentation****Condition**

Quality assurance documentation used to demonstrate continuing competency to perform materials testing was not retained. This documentation provides assurance regarding testers' proficiency in conducting materials testing.

**Effect/Potential Impact**

Although not demonstrated within the sample tested in this engagement, materials testers may be conducting tests they are not certified to perform. This can result in poor quality materials, additional costs, and safety concerns on projects.

**Criteria**

The Quality Assurance Program is mandated by 23 CFR 637 and requires that Construction Division (CST) and the districts retain documentation of all individuals qualified under their authority. Items required as documentation include:

- a listing of all tests an individual is qualified to perform
- a form listing the key elements of the test method used by the evaluator to record the results
- a copy of qualification certificates issued
- copies of written examinations

**Cause**

The Quality Assurance Program manual has not been updated to the process the Districts currently follow. SiteManager, as the document of record, generates the certificates for qualified district testers. Labinator has the functionality to print certificates at any time.

**Evidence**

Review of tester certifications identified 33 of 123 (27%) did not have required support; however, all testers were proven to be certified.

**Management Action Plan (MAP):****MAP Owner:**

Darren G. Hazlett, P.E., Construction Division Deputy Director

**MAP 2.1:**

An update to the Quality Assurance Program manual will be performed to include Labinator, its functionality, and the expectations of document retention within Labinator.

**Completion Date:**

January 15, 2016

## Summary Results Based on Enterprise Risk Management Framework

Audit Results Dashboard				
Materials Testing				
Business Objectives (Reporting, Operational, Compliance)		Scope Areas Evaluated		
		O,C	O,C	
ERM Component	Control Activities	Materials Testing and Support	Materials Certifications	
Control Environment	Organizational Tone			
	Planning			
	Forecasting			
	Goal-Setting			
	Cost-Benefit Analysis			
Risk Assessment	Business Continuity			
	Evaluations/Analysis			
	Management Action Plans			
Control Activities	Policies/Procedure Development & Maintenance		2	
	Approvals/Authorizations			
	Supporting Evidence/Records Availability		2	
	Segregation of Duties	1		
	Safeguarding Assets			
Information & Communication	Information Classification			
	Information Input	1		
	Information Processing			
	Output/Reporting and Messaging			
Monitoring	Exception Reporting Review	1	1	
	Reconciliations/Root-Cause Analysis			
	Peer Reviews			
	Management Representations			
Scope Area Assessment				
Rating Assessment Grid		Exemplary	Satisfactory	Needs Improvement
				Unsatisfactory

## Closing Comments

The results of this audit were discussed with the Construction Division and the Districts on September 22, 2015. We appreciate the assistance and cooperation received from the Districts and the Construction Division contacted during this audit.